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THE INSECT FAUNA OF THE SUDBURY DISTRICT, ONTARIO.

BY JOHN D. EVANS, TRENTON.

Prior to the advent of the Canadian Pacific Railway, in the year 1883, this district was entirely unsettled, being, in fact, a *terra incognita* to all except servants of the Hudson Bay Co., officials of the Geological Survey, and Provincial Government surveyors. But it had been devastated to a large extent by forest fires, which occurred at intervals during a period of some fifty or sixty years previously. These fires entirely destroyed the virgin forest (which consisted chiefly of white pine) over large tracts, by killing the trees and leaving them susceptible to the attacks of their insect enemies, and presenting at that date (1883) a desolate appearance, caused by the thickly-standing tall bare trunks and stubs of trees, among which had sprung up a thick growth of saplings of white birch, poplar, etc.

To this great destruction of timber, left to the mercy of its many insect foes and their parasites, etc., may no doubt be attributed the great variety and numbers of insects of the various orders, not to mention the pests of human existence, viz., mosquitoes, and black and sand-flies, the wood borers being especially numerous, both specifically and numerically.

Isolated patches of green pine forest were, however, left untouched among the general destruction, one of which was in the immediate vicinity of the town of Sudbury. This timber was utilized in the construction of the railway, and in after years the bark-covered stumps afforded a great number of a large series of species of insects to those in search of such inhabitants.

The writer, during a period of some seven seasons, collected in the several orders enumerated below, in the lists of which will appear the names of all the species he has as yet had worked out and determined.

LIST OF COLEOPTERA.

In the following list, containing 494 species, there are sixty-five species not enumerated in the Society's list, but of these, four have been

heretofore recorded by Mr. W. H. Harrington, five by Mr. Kilman, and six by Dr. John Hamilton, as having occurred in Canada, leaving fifty to be added to the Society's list, which are designated by an asterisk. My list gives the total number of individuals of each species taken during seven years (1886, 1888-1893), and will thus show which were of common occurrence and which were rare. These were all captured within a radius of five miles from the town of Sudbury, excepting *Calloides nobilis*, Say, and *Leptura vittata*, Germ., which were taken at Algoma Mills, on Georgian Bay, distant from Sudbury about ninety-five miles. *Calosoma scrutator*, Fab., was captured by Dr. Peters within the limits of the town early in the season of 1889, from under the bark of a pine stump, where it had no doubt hibernated during the previous winter.

There are still upwards of one hundred species requiring determination. My warmest thanks are due, and are hereby tendered, to Dr. John Hamilton for his kindness in determining the majority of these species:

LIST OF COLEOPTERA TAKEN AT SUDBURY, ONTARIO.

CICINDELIDÆ.		Pterostichus coracinus, Newm..	3
<i>Cicindela longilabris</i> , Say	104	*	"
" 6-guttata, Fab	1	"	moestus, Say.....
" limbalis, Lec.....	28	"	punctatissimus,
" vulgaris, Say	33	Rand.....	1
" 12-guttata, Dej	6	"	Pterostichus lucublandus, Say. 20
CARABIDÆ.		"	mutus, Say..... 4
<i>Calosoma scrutator</i> , Fab.....	1	"	orinomum, Leach 3
" frigidum, Kirby.....	5	"	Luczotii, Dej.... 22
" calidum, Fab.....	3	"	patruelis, Dej... 1
<i>Elaphrus ruscarius</i> , Say.....	1	"	Amara exarata, Dej
<i>Dyschirius nigripes</i> , Lec.....	1	"	latior, Kirby..... 1
<i>Nomius pygmæus</i> , Dej	8	"	fallax, Lec
* <i>Psydrus piceus</i> , Lec	1	"	erratica, Sturm..... 4
<i>Bembidium carinula</i> , Chd.....	1	"	interstitialis, Dej 5
* " paludosum, Sturm	1	"	subænea, Lec
" inaequale, Say.....	1	"	musculus, Say
" rupestre, Dej.....	1	*	Platynus sinuatus, Dej..... 4
* " conspersum, Chd.	1	"	errans, Say..... 4
" versicolor, Lec... .	3	"	affinis, Kirby..... 1
<i>Tachys nanus</i> , Gyll.	11	"	melanarius, Dej.... 1
		"	corvus, Lec..... 1

Platynus cupripennis, Say.....	5	Rhantus binotatus, Harr.....	15
" 8-punctatus, Fab....	1	Colymbetes sculptilis, Harr...	7
" placidus, Say.....	7	Hydaticus stagnalis, Fab	2
" vicinus, G. & H....	1	Dytiscus fasciventris, Say	1
" obsoletus, Say.....	95	" Harrisii, Kirby.....	9
" 4-punctatus, Dej....	7	Acilius semisulcatus, Aubé...	6
" sordens, Kirby.....	4		
" lutulentus, Lec....	3	GYRINIDÆ.	
Lebia viridis, Say.....	3	Gyrinus affinis, Aubé.....	1
" pumila, Dej.....	3	" picipes, Aubé.....	3
Cymindis cribicollis, Dej....	1		
Chlaenius sericeus, Forst.....	3	HYDROPHILIDÆ.	
" pennsylvanicus, Say.	2	Helophorus nitidulus, Lec....	72
Agonoderus pallipes, Fab....	54	" linearis, Lec.....	2
Harpalus viridiæneus, Beauv.	4	Hydræna pennsylvanica, Kies.	1
" fallax, Lec.....	1	Hydrocharis obtusatus, Say ..	1
" pleuriticus, Kirby....	3	Philhydrus nebulosus, Say ..	3
" cautus, Dej.....	1	Hydrobius fuscipes, Linn.....	11
" rufimanus, Lec.....	2	Cryptopleurum vagans, Lec ..	3
Stenolophus fuliginosus, Dej..	1		
" conjunctus, Say..	2	SILPHIDÆ.	
" ochropezzus, Say.	1	Necrophorus vespilloides,	
Tachycellus nigrinus, Dej....	3	Hbst.....	6
Anisodactylus baltimorensis,		Necrophorus tomentosus, Web.	1
Say.....	2	Silpha surinamensis, Fab.....	17
		" lapponica, Hbst.....	17
HALIPLIDÆ.		" noveboracensis, Forst..	32
*Haliplus borealis, Lec.....	2	" americana, Linn.....	14
" ruficollis, Dej.....	12	Choleva clavicornis, Lec.....	1
		Prionochaëta opaca, Say	1
DYTISCIDÆ.		Liodes globosa, Lec.....	2
Coelambus inæqualis, Fab....	12	Liodes basalis, Lec.....	1
*Ilybius subæneus, Er.....	11	Agathidium politum, Lec.....	1
" biguttatus, Germ....	1		
Agabus parallelus, Lec	1	PSELAPHIDÆ.	
" seriatus, Say.....	2	*Bryaxis conjuncta, Lec.....	3
" infuscatus, Aubé	2		
" gagates, Aubé	2	STAPHYLINIDÆ.	
* " leptapsis, Lec.....	2	*Aleochara lata, Grav.....	12
Scutopterus Hornii, Cr.....	1	" bimaculata, Grav.	1
		Gyrophæna socia, Er.....	964

Heterothops fumigatus, Lec..	Coccinella transversoguttata,
Quedius lœvigatus, Gyll.....	Fab..... 35
Listotrophus cingulatus, Grav..	Coccinella 5-notata, Kirby .. 1
Creophilus villosus, Grav.....	" monticola, Muls... 3
Philonthus æneus, Rossi.....	" tricuspis, Kirby... 15
" varians, Payk.....	" sanguinea, Linn... 1
" micans, Grav....	Adalia bipunctata, Linn..... 1
" lomatus, Er.....	Harmonia picta, Rand..... 1
" cyanipennis, Fab..	" 14-guttata, Linn... 2
" sordidus, Grav....	*Harmonia 14-guttata, var. obliqua, Rand..... 1
Xantholinus cephalus, Say ...	Harmonia 12-maculata, Gebl. 5
" obscurus, Er....	Anatis 15-punctata, Oliv..... 9
Baptolinus macrocephalus,	Chilocorus bivulnerus, Muls.. 2
Nord.....	*Exochomus marginipennis, Lec 1
Lathrobium simplex, Lec.....	*Scymnus americanus, Muls... 1
Lithocharis confluens, Say....	ENDOMYCHIDÆ.
Pæderus littorarius, Grav.....	Lypoperdina ferruginea, Lec .. 1
Tachinus memnonius, Grav...	Mycetina perpulchra, Newm.. 3
Tachyporus elegans, Horn....	EROTYLIDÆ.
Boletobius cinctus, Grav....	Tritoma thoracica, Say..... 1
Habrocerus magnus, Lec.....	COLYDIIDÆ.
*Olisthærus megacephalus, Zett. 2	Cerylon castaneum, Say.... . 39
" substriatus, Gyll..	CUCUJIDÆ.
Platystethus americanus, Er... 4	Silvanus planatus, Germ..... 2
Oxytelus rugosus, Grav..... 5	Catogenus rufus, Fabr..... 2
*Homalium punctiventre, Fauv. 1	Pediacus fuscus, Er..... 44
Anthobium convexum, Fauv.. 18	Cucujus clavipes, Fab..... 3
SCAPHIDIIDÆ.	Dendrophagus glaber, Lec... 5
*Scaphisoma punctulatum, Lec. 1	CRYPTOPHAGIDÆ.
" terminatum, Melsh 2	Loberus impressus, Lec..... 5
CORYLOPHIDÆ.	MYCETOPHAGIDÆ.
Sacium lugubre, Lec..... . 5	Mycetophagus flexuosus, Say.. 1
COCCINELLIDÆ.	Mycetophagus pluripunctatus,
Anisosticta strigata, Thunb.. 11	Lec 1
Hippodamia 13-punctata, Linn. 33	Mycetophagus tenuifasciatus,
" parenthesis, Say..	Horn..... 1
Coccinella trifasciata, Linn... 39	
" 9-notata, Hbst....	

DERMESTIDÆ.

<i>Byturus unicolor</i> , Say.....	7
<i>Dermestes caninus</i> , Germ.....	12
" <i>lardarius</i> , Linn.....	28
<i>Attagenus piceus</i> , Oliv.....	1
<i>Orphilus glabratulus</i> , Fab.....	13

HISTERIDÆ.

<i>Hister sedatus</i> , Lec.....	4
" <i>abbreviatus</i> , Fab.....	2
* " <i>marginatus</i>	1
" <i>deparator</i> , Say.....	4
" <i>Lecontei</i> , Mars.....	4
" <i>attenuatus</i> , Lec.....	2
* <i>Paromalus estriatus</i> , Lec.....	1
<i>Saprinus rotundatus</i> , Kug.....	1
" <i>fraternus</i> , Say.....	5
<i>Plegaderus transversus</i> , Say... 17	

NITIDULIDÆ.

* <i>Cercus pennatus</i> , Mun.....	6
<i>Carpophilus brachypterus</i> , Say.....	4
<i>Colastus truncatus</i> , Rand.....	4
* <i>Epuraea labilis</i> , Er.....	8
<i>Nitidula bipustulata</i> , Linn.... 49	
" <i>rufipes</i> , Linn.....	28
<i>Omosita colon</i> , Linn.....	19
<i>Ips fasciatus</i> , Oliv.....	36
" <i>sanguinolentus</i> , Oliv.	8
" <i>vittatus</i> , Say	25
* <i>Rhizophagus cylindricus</i> , Lec. 4	

TROGOSITIDÆ.

<i>Tenebrioides mauritanica</i> , Linn. 1	
<i>Peltis ferruginea</i> , Linn.....	3
<i>Calitys scabra</i> , Thumb.....	9
<i>Grynocharis 4-lineata</i> , Melsh. 4	

BYRRHIDÆ.

<i>Cytillus sericeus</i> , Forst.....	2
<i>Byrrhus cyclophorus</i> , Kirby.. 3	
" <i>Kirbyi</i> , Lec. 1	

DASCYLLIDÆ.

<i>Cyphon variabilis</i> , Thum... 4	
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ELATERIDÆ.

<i>Adelocera aurorata</i> , Lec.....	2
" <i>obtecta</i> , Say.....	7
" <i>brevicornis</i> , Lec. ...	9
<i>Alaus myops</i> , Fab.....	11
<i>Cardiophorus convexulus</i> , Lec. 1	
<i>Cryptohypnus abbreviatus</i> , Say. 5	
" <i>tumescens</i> , Lec. ...	7
<i>Elater pedalis</i> , Germ.....	18
" <i>nigrinus</i> , Payk	22
" <i>mixtus</i> , Hbst	3
" <i>pullus</i> , Germ	14
" <i>vitiosus</i> , Lec.	14
" <i>semicinctus</i> , Rand ...	1
" <i>luctuosus</i> , Lec.....	50
" <i>nigricans</i> , Germ.....	16
" <i>apicatus</i> , Say	60
* " <i>phenicopterus</i> , Germ. 25	
<i>Megapenthes stigmosus</i> , Lec. 1	
<i>Agriotes fuscus</i> , Lec.....	21
" <i>limosus</i> , Lec.....	303
<i>Dolopins lateralis</i> , Esch.....	18
<i>Betarmon bigeminatus</i> , Rand. 2	
<i>Melanotus castanipes</i> , Payk .. 34	
" <i>communis</i> , Gyll... 1	
<i>Limonius æger</i> , Lec.....	25
<i>Campilus denticornis</i> , Kirby.. 15	
<i>Sericosomus incongruus</i> , Lec. 15	
<i>Corymbites virens</i> , Schr.....	33
" <i>vernalis</i> , Hentz... 3	
* " <i>resplendens</i> , Esch. 17	
" <i>spinulosus</i> , Lec.... 9	
" <i>carcinus</i> , Germ.. 1	
" <i>mendax</i> , Lec..... 1	
" <i>insidiosus</i> , Lec... 13	
" <i>falsificus</i> , Lec.... 3	

Corymbites	triundulatus,	Rand	59	
"	propola,	Lec	15	
"	cruciatus,	Linn	62	
"	aeripennis,	Kirby	150	
"	metallicus,	Payk	28	
*	"	flavipes	6	
Asaphes	memnonius,	Hbst	1	
THROSCIDÆ.				
Drapetes	geminatus,	Say	.....
Throscus	constrictor,	Say	3	
*	"	Chevrolati,	Bonv	2
BUPRESTIDÆ.				
Chalcophora	virginensis,	Drury	13	
"	liberta,	Germ	1	
Dicerca	prolongata,	Lec	53	
"	divaricata,	Say	10	
"	tenebrosa,	Kirby	37	
"	chrysea,	Melsh	1	
"	tuberculata,	Chev	2	
*	"	lugubris,	Lec	3
Buprestis	consularis,	Gory	4	
"	maculiventris,	Say	59	
"	fasciata,	Fab	207	
*	"	sulcicollis,	Lec	3
"	striata,	Fab	25	
Melanophila	longipes,	Say	80	
"	fulvoguttata,	Harr	3	
Anthaxia	aeneogaster,	Lap	11	
Chrysobothris	femorata,	Fab	11	
"	floricola,	Gory	1	
"	dentipes,	Germ	5	
"	trinervia,	Kirby	4	
Chrysobothris	scabripennis,	Lap. and Gory	1	
*Agrilus	granulatus,	Say	1	
*	"	anxius,	Gory	2
"	politus,	Say	2	
"	egenus,	Gory	1	

LAMPYRIDÆ.

Celetes	basalis,	Lec	.....	2
Cænia	dimidiata,	Fab	.....	1
Eros	aurora,	Hbst	.....	39
Plateros	canaliculatus,	Say	16	
Calochromus	perfacta,	Say	5	
Ellychnia	corrusca,	Linn	41	
Pyractomena	borealis,	Rand	4	
Photuris	pennsylvanica,	Deg	38	
Podabrus	modestus,	Say	36	
"	lateralis,	Lec	14	
Telephorus	fraxini,	Say	15	
*	"	Curtisii,	Kirby	14
MALACHIDÆ.				
Collops	tricolor,	Say	.....	2
Anthocomus	Erichsoni,	Lec	1	
Dolichosoma	foveicolle,	Kirby	1	
CLERIDÆ.				
Clerus	quadriguttatus,	Oliv	5	
*	"	nigrifrons,	Say	1
"	ichneumoneus,	Fab	6	
Thanasimus	dubius,	Fab	24	
"	undulatus,	Say	2	
"	nubilus,	Kl	60	
Thaneroclerus	sanguineus,	Say	1	
Hydnocera	difficilis,	Lec	4	
"	verticalis,	Say	1	
*	"	tabida,	Lec	2
Chariessa	pilosa,	Forst	1	
Necrobia	violaceus,	Linn	7	
PTINIDÆ.				
Dinoderus	substriatus,	Payk	21	
"	cibratus,	Lec	1	
CIOIDÆ.				
Rhipidandrus	paradoxus,	Beauv	.....	2

(TO BE CONTINUED.)

NOTES ON COLLECTING, AND NAMES NEW TO THE
CANADIAN LIST.

BY J. ALSTON MOFFAT, LONDON, ONT.

The season of 1894 was, in this locality, of rather an unusual character. Spring appeared with March, lasting up to the 25th, when we had a series of light snow-storms and hard frosts, which continued to the 7th of April. Then we had weeks of the most charming, moderate and enjoyable weather. After the middle of May we had frequent thunder-showers; the 28th was cold and snowy, with a killing frost at night. It remained cold to the 7th of June, when it changed to warm weather, and for the rest of June and throughout July we had an almost unbroken time of excessive heat. August was dry as well as hot, and its effects were seen in the coloured leaves of trees and bushes, and much more so in weeds and grasses. In the early part of September rain set in, which freshened vegetation greatly, but frosts followed at the end of the month.

I kept a look-out for *P. cespiontes*, to see if it would be as plentiful as in the previous year. During June I saw a number on the wing. On the 7th of July I got two full-fed larvae, which matured in due time, but during the remainder of the season I did not see a specimen of *cespiontes* in any stage. Just the reverse of my last season's observations of it.

During the latter part of June and early part of July insect life was in profusion, but a combination of causes prevented me from giving close attention to it, yet I secured several interesting things new to me.

I am indebted to Professors C. H. Fernald and J. B. Smith for the following names, which are new to the Canadian list; excepting the geometer, which was identified by means of Packard's monograph:—

Plusia dyaus, Grote. Taken by Anderson. This seems to be properly a more southerly species; might easily be mistaken for *precationis*.

Bomolocha citata, Grote. Taken by Anderson. Grote says: "Our smallest species. Expanse, 19 mm."

Bomolocha toreuta, Grote. "Very recognizable from the whitish blotch on internal margin of primaries."—Grote.

Petrophora testata, Linn. I took a single specimen of this handsome insect on the 9th of August, 1894, and diligent search failed to secure another. As an example of "unequal distribution," I will mention that there are now five species of *Petrophora*, represented in the

Society's collection by single specimens, taken by myself, some of them many years ago, and have never met with another specimen of either of them. These are *testata*, *populata*, var. *Packardia*, *prunata*, *cunigerata*, var. *disjunctaria*, *silacea*, var. *defluata*. They are all European, as well as American.

Elasmopalpus tartarellus, Zell. Anderson.

Exartema micantana, Fernald, M. S. This species I find only in a marshy spot at the east end of the city. I have taken it in considerable numbers during July for three seasons.

Sericoris dealbana, Walk.

" *abietana*, Fern., M. S.

Semasia cineriana, Fern., M. S. I came upon this species resting on the flowers of a purple aster on the 24th of September, 1892. On the 30th I got more, and on the 10th of October yet more. In '93 I saw two, but secured none; in '94 I did not see one; the asters were all dried up before their time for appearing came.

Semasia Goodelliana, Fern., M. S.

Steganoptycha balliana, Fern., M. S.

Ecdytolopha insiticiana, Zell. The larva of this moth is, in Prof. Fernald's Synonymical Catalogue of N. A. Tortricidae, reported to be a borer in the stems of locust trees.

Pseudogalleria inimicella, Zell.

Depressaria argillacea, Wlsm.

" *pulvipennella*, Clem.

The two last were taken by Andersop.

We are requested to inform our Canadian subscribers that the Department of Agriculture of Ontario is very kindly issuing bound copies of the combined Reports, for 1894, of the Fruit Growers' Association and the Entomological Society of Ontario. No copy, however, will be sent to any one who has not paid his subscription for the current year. This difficulty may be overcome and the volume secured by at once sending the amount of arrears to Mr. J. A. Moffat, Victoria Hall, London, who will inform the Deputy Minister of Agriculture that such has been done.

THE COLEOPTERA OF CANADA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

X. THE DYTISCIDÆ (DYTISCINI AND CYBISTRINI) OF ONTARIO AND QUEBEC.

The species included in the above tribes are all large or moderate sized insects, and among them are found those in which the perfection of specialization of the ♂ tarsi reaches the highest pitch. The basal disks on the anterior feet often attain considerable dimensions, while occasionally we find three well-marked sizes of disks on the same foot—as, for example, in *Acilus*. These make beautiful preparations for microscopic study, the method of treating them being as follows: Cut off the leg a little below the knee, and place the severed piece in an aqueous 25% solution of caustic potash for a few days, until it becomes nearly transparent. Then take out of the potash and place in soft water for twenty-four hours, next removing to strong alcohol for about the same length of time. If now placed in oil of cloves for several hours, it is ready to be mounted on a slide in the ordinary way for examination by transmitted light. A great deal depends on carefully watching while in the potash solution; the specimen should not be so dark as to obstruct the light-rays to any very great extent, nor so transparent as to render the overlying parts to be separated with difficulty from the underlying, as in the latter case the chitin is often rendered so pliable as to lose the original form. Each species has its own arrangement of disk bearing hairs by which it may be separated from its congeners, though the resemblance is sometimes very close.

For the sake of convenience, I have included both of the above tribes in one generic table; of the second, the genus *Cybister* is the only representative, the tribal characters being given on page 72.

A. Length, above an inch.

Hind tarsi with one claw, anterior ♂ tarsi with four rows of equal disks..... *Cybister*.

Hind tarsi with two claws, anterior ♂ tarsi with two large and numerous small disks..... *Dytiscus*.

AA. Length scarcely exceeding half an inch.

b. Spurs of hind tibiæ acute at tip..... *Hydaticus*.

bb. Spurs of hind tibiæ emarginate at apex.

c. Elytra either sulcate (?) or with distinct, closely-placed moderate-sized punctures..... *Acilus*.

- cc. Elytra hardly distinctly punctured, sometimes appearing very finely punctulate or partially aciculate.
- d. Middle thighs with long, conspicuous setæ. *Thermonectes*
- dd. Middle thighs with short, inconspicuous setæ. *Graphoderes*.

The emargination of the tips of the tibial spurs in the last three genera is very fine, and must be looked for with care, and a good lens. The other characters seem sufficiently evident if ordinary discrimination is used.

HYDATICUS, Leach.

Three of these occur, which are distinguished with some difficulty, excepting in the case of well-marked individuals, which separate thus:—

- Above rufo-piceous, sides of thorax and of elytra obscurely rufo-testaceous, .50 in..... *piceus*, Lec.
- Above piceous, thorax rufous with black basal fascia. Elytra with distinct yellow margin.
- Larger (.50 in.). Elytra with margin and usually a basal band from which extend four or five longitudinal lines, fulvous. *stagnalis*, Fabr.
- Smaller (.48 in.). Elytra with a submarginal yellow vitta, recurved at the humerus and attenuated to the end, which is behind the middle, margin rufous towards the tip. *bimarginatus*, Say.

DYTISCUS, Linn.

Eight species are on the Canadian lists, and are easily known from all other Dytiscidae, except *Cybister*, by their large size. The sides of the

thorax and usually the front and hind margins are yellow, the outer margins of the elytra always so. They separate into groups according to the form of the labrum and of the hind coxal plates, the processes of which extend slightly over the apparent bases of the hind legs, and are divergent and either rounded, simply acuminate, or spinose at tip. The females of some species have sulcate elytra, while others are smooth. The spiracles of all make very pretty objects for the microscope, being protected by dendroid hairs which fringe the margins, and well repay the trouble of preparation. In the following table I have substituted the name *circumcinctus*, Ahr., for *anxius*, Mann., following the opinion doubtfully expressed in the Henshaw Check List.



FIG. II.

A. Labrum nearly truncate at middle, apices of coxal processes obtuse; thorax with all the margins yellow. 1.60 in. (fig. 11.)..... *Harrisii*, Kirby.

AA. Labrum distinctly emarginate at middle.

- b. Coxal processes not spinose at apex.
- c. Thorax with sides yellow, base and apex not or only indistinctly so.
- d. Body beneath reddish, margins of ventral segments and some other markings black. 1.04-1.25 in..... *fasciventris*, Say.
- dd. Body beneath blackish or piceous.
 - Elytral pale margin broad to apex.
1.08 in..... *hybridus*, Aubé.
 - Elytral pale margin narrowing to apex and with oblique subapical fascia.
1.28-1.35 in..... *verticalis*, Say.
- cc. Thorax with all the markings distinctly and usually rather broadly yellow.
 - Coxal processes blunt at tip. 1.20 in... *sublimbatus*, Lec.
 - Coxal processes acuminate. 1.32 in... *marginalis*, Linn.
- bb. Coxal processes spinose at apex.
 - Entirely pale beneath except the middle of the metasternum. 1.28 in..... *circumcinctus*, Ahr.
 - Under side with black markings on margins of ventral segments and on metasternum.
1.25-1.40 in..... *dauricus*, Gebl.

ACILIUS, Leach.

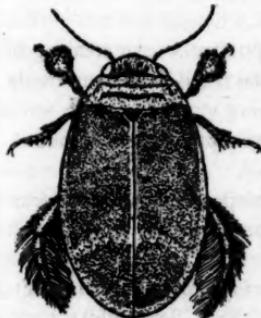


FIG. 12.

The two known from Canada both have females with sulcate elytra, though *fraternus* has also a smooth form. They separate with difficulty, the main characters being these:—

Fulvous above, head with base and an M-like mark on the vertex black; thorax with two transverse black lines, the anterior larger. Elytra closely irrorated with black dots and with subapical yellow fascia, posterior femora slightly suffused with black at base. .50-.56 in. (fig 12.) *semisulcatus*, Aubé.

Darker, slightly larger, more densely punctured; the mark on the vertex is not defined, the thoracic lines are broader and the femora nearly black. The sulci of the ♀ elytra are more abbreviated at base, while in the ♂ the tufts of hair on the inner edge of the three basal joints of the intermediate tarsi are much less developed than in *semisulcatus*. *Fraternus*, Harr.

THERMONECTES, Esch.

Only one Canadian form, *T. basilaris*, Harr., a somewhat convex beetle, blackish above; head with the front and a transverse line on the vertex fulvous, thorax with sides and a median transverse line of the same colour. Elytra with the external margin, a sub-basal fascia and some vague irrorations yellowish. .36-.40 in.

GRAPHODERES, Esch.

Thorax fulvous, black on anterior and posterior margins; head yellowish, the occiput and an M-like mark black. .50 in.....*cinereus*, Linn.
Smaller, testaceous, beneath rufous; head in front, sides of thorax and of elytra yellowish. .46 in.....*liberus*, Say.

According to late authorities, the name *fasciatocollis* should give way to *cinereus*, and I have accordingly used the latter.

CYBISTER, Curt.

One very large insect, *C. fimbriolatus*, Say, represents the genus with us. It is of ovate form, nearly black, but with a greenish cast, the sides of the thorax and elytra with a broad yellow margin. In the ♀ the wing covers and thorax are finely strigose with short lines, the sutural region smoother. Length, about 1.20 in.

The following are the titles of the more important works treating of the American forms of the Dytiscidæ and Haliplidæ. All have been freely used in the preparation of the foregoing pages:—

1838. Aubé., Ch. Spécies général des Hydrocanthares et Gyriniens. Paris.

1855. Leconte, J. L. Analytical table of the species of Hydroporus found in the United States, with descriptions of new species. Proc. Acad. Nat. Sci., Phila., VII., pp. 290-299.

1862. Leconte, J. L. Synopsis of the species of Colymbetes inhabiting America north of Mexico. Proc. Acad. Nat. Sci., Phila., pp. 521-523.

1873. Crotch, G. R. Revision of the Dytiscidæ of the United States. Trans. Am. Ento. Soc., IV., pp. 383-424.

1882. Sharp, David. On Aquatic Carnivorous Coleoptera or Dytiscidæ. Trans. Royal Dublin Soc., II., Ser. 2, pp. 179-1003.

1883. Horn, G. H. Miscellaneous Notes and Short Studies of North American Coleoptera. Trans. Amer. Ento. Soc., X. (Dytiscidæ, pp. 276-284).

ON TWO NEW SPECIES OF PLATYCYERUS.

BY THOS. L. CASEY, U. S. A., NORFOLK, VA.

I am scarcely warranted in attempting a detailed table of this genus, because a number of species are known to me only by a single sex; but in looking over the material, it can be readily perceived that there are two sections, the first represented by *quercus*, *oregonensis* and *depressus*, being characterized by great sexual differences in the mandibles, and the second, represented by all the other species, having the mandibles unmodified in the male. The second section may be divided into three groups: the first, represented by *Agassii*, *pacificus* and *parvicollis*, which, judging by analogy, have the hind tarsi long and slender in both sexes; the second, composed of *californicus* and *thoracicus*, having the hind tarsi short, at least in the female; and the third, with stout and triangular tibiae, at present represented by *Keeni* alone.

The name of this genus is changed in the recent Catalogue of European Coleoptera, to *Systemocerus*, Weise, but while admitting the validity of the change, I do not think that *Platycerus* should include the species called *Lucanus*, by Scopoli and others, because it is probable that Geoffroy did not describe any species under the name *Platycerus*, and the genus *Platycerus*, Geoff., should therefore be regarded as not published. I have not been able to consult the original work of Geoffroy, however, and am not certain that my premises are correct.

P. Keeni, n. sp.—Body very stout, convex, polished, blackish-castaneous in colour. Head small, coarsely and confluent punctate, two oblique subelevated areas of the occiput subimpunctate; mandibles very small, the internal tooth at the middle small and broadly triangular; antennæ short, rufo-testaceous, the scape slightly longer than the funicle, the latter compact, the three outer joints increasing gradually in width but not prolonged; club short, abrupt, compact, not so long as the funicle, three-jointed, the first abruptly, more than twice as wide as the last joint

of the funicle, more than twice as wide as long and a little wider than the second, third with a broad sensitive terminal button. *Prothorax* large, one-half wider than long, widest and narrowly rounded at the middle; sides feebly sinuate toward base, very strongly so when viewed sublaterally; apex broadly, feebly sinuate, much narrower than the base and scarcely more than one-half as wide as the disk, the latter convex, coarsely, sparsely punctate, the punctures closer near the apex, the surface rapidly declivous laterally, the side margins not reflexed. *Scutellum* well-developed, densely punctate. *Elytra* scarcely one-third longer than wide and but slightly more than twice as long as the prothorax, at base equal in width to the disk of the latter; humeri exposed, obtusely angulate; apex very broadly rounded; disk sparsely, moderately coarsely punctate, the punctures uneven in arrangement, with scarcely any trace of punctured series, alternate intervals subcostiform. *Legs* moderate in length, very stout; femora coarsely, sparsely punctate; tibiae triangular, very stout, coarsely, asperately punctate and seriatel setose; tarsi short and stout, the posterior much shorter than the tibiae. *Hypomera* setose. Length, 12.5 mm.; width, 5.7 mm.

Queen Charlotte Island.

Though somewhat allied to *californicus*, this species is readily distinguishable by its larger size, obese form, subcostulate elytra and very stout legs. The bilaterally symmetrical club may possibly be a sexual character, as I am under the impression that there is a specimen of *californicus*, in the cabinet of Mr. Rivers, having a similar antennal character; if so, the hind tarsi of the *californicus* group are short in both sexes.

This interesting species was discovered by Rev. J. H. Keen, and the original specimen kindly given me for description by Mr. Wickham, with permission of Mr. James Fletcher, of Ottawa. It has recently been taken in abundance.

P. thoracicus, n. sp.—Stout, convex, moderately shining, black, with a scarcely visible piceous tinge. *Head* small, coarsely, confluent punctate, a median area at base subimpunctate; mandibles very small; antennæ short, black, the scape slightly longer than the funicle, the latter a little longer than the club, with the joints compactly joined, the sixth scarcely wider and not inwardly prolonged; club in great part sensitive, the two basal joints about twice as wide as long, more developed internally, the last transversely ovulate and eccentrically attached. *Prothorax* large, one-half wider than long, widest and more strongly rounded

at basal third; sides rapidly convergent toward base and deeply sinuate at the basal angles, the latter right; apex feebly sinuate, but slightly narrower than the base and two-thirds as wide as the disk, the latter feebly impressed along the basal margin, feebly explanato-reflexed at the sides, and coarsely, very closely punctate, the punctures sparser near the centre. *Elytra* nearly one-half longer than wide, distinctly more than twice as long as the prothorax, at base not as wide as the disk of the latter; disk coarsely, not very closely, unevenly punctate, with tolerably uniform but unevenly impressed series of coarser punctures. Legs moderate in length, rather slender; femora remotely punctate; tibiae slender, not much wider at apex, with impressed series of asperate punctures, seriatel setose; tarsi short, stout, but slightly more than one-half as long as the tibiae. Hypomera coarsely and scarcely confluent punctate, very inconspicuously setose. Length, 11.0 mm.; width, 5.0 mm.

California.

Differs radically from *Keeni* in the structure of the antennal club and tibiae. It is related to *californicus*, but differs conspicuously in its obese form and larger prothorax, and also in its coarser and much denser sculpture throughout. The types of both this species and *Keeni* are apparently females.

NOTES ON HYMENOPTERA.

BY W. HAGUE HARRINGTON, F. R. S. C., OTTAWA.

The advent of another collecting season finds me with a very large proportion of my last year's captures still undetermined, and in many instances even unexamined. A few remarks, however, in regard to my success with the Hymenoptera may induce some of our younger members to pay more attention to this order. Probably 500 species were collected, a large proportion of which were of the smaller forms, and it seemed, indeed, that many of the larger species were much less numerous than in some seasons. Special attention was given to the collection of the micro-hymenoptera, for these are so poorly represented in Canadian collections. In making a rough summary of the species, I find about 125 species belonging to the *Aculeata*, and 100 to the *Phytophaga*, the remainder being distributed among the different families of parasitic forms. There are many interesting additions to my collection, and many gaps have been filled in. Mr. Ashmead's monograph of the *Proctotrypids* has made it abundantly evident that the knowledge of the

Canadian species was very limited, and I made a special effort to obtain as many examples as possible. I took altogether about 350 specimens, and now find that over 50 species are represented. This will give any collector an idea of what he may expect to secure if he have the necessary patience to preserve and mount so much small and inconspicuous material. In separating my species I have found most difficulty with the sub-family Belytinæ, in which several of the genera have proved stumbling-blocks, which I attribute, however, to my deficient study of them, and not to any lack in the excellent work of Mr. Ashmead. As some of the species are still undetermined, a list would be imperfect, but the genera represented are as follows :

Isobrachium, *Anoxus*, *Perisemus*, *Goniozus*, *Gonatopus*, *Phorbas*, *Lygocerus*, *Megaspilus*, *Ceraphron*, *Aphanogmus*, *Telenomus*, *Prosacantha*, *Hoplogrypon*, *Gryon*, *Calotelia*, *Macroteleia*, *Hoploteleia*, *Scelio*, *Proctotrypes*, *Leptorhaptus*, *Acropista* ?, *Belyta* ?, *Oxylabis*, *Cinetus*, *Pantoclis* ?, *Zygota*, *Aclista* ?, *Spilomicrus*, *Paramesius*, *Aneurhynchus*, *Galesus*, *Loxotropa*, *Tropidopria*, *Diapria*, *Ceratopria*, *Phænopria*, *Basalys*, *Polymerus*, *Isocybus*, *Helorus*.

Among the additions to the Canadian fauna are the following :—

Isobrachium myrmacophilum, Ashm., ♂; *Anoxus Chittendenii*, Ashm., ♂; *Goniozus foveolatus*, Ashm., ♂; *Gonatopus flavifrons*, Ashm., ♀; *Phorbas laticeps*, Ashm., ♀; *Calotelcia Marlattii*, Ashm., ♂ ♀; *Macroteleia virginiensis*, Ashm., ♀ ♂, and *Hoploteleia floridana*, Ashm., ♀.

I have recently had the pleasure of examining a small collection of Hymenoptera made by Mr. William Metcalfe, of Toronto, and which contained a few species not yet taken at Ottawa, and several others which are rare. Mention may be made of *Cræsus laticulus*, Nort., ♀; *Nematus similaris*, Nort., ♀ (the Locust saw-fly); *Sciapteryx punctum*, Prov., ♀; *Macrophyia pulchella*, Klug., ♀; *Pamphilus ruficeps*, Hargtn., ♀; *Xyela minor*, Nort., ♂ ♀; *Ibalia maculipennis*, Hald., ♀; *Ichneumon hospitus*, Cress., ♀; *Mesostenus sagax*, Prov., ♀; *Cteniscus annulipes*, Cress., ♀; *Xylonomus canadensis*, Hargtn., ♀; *Isobrachium myrmecophilum*, Ashm., ♀; *Tachytes crassus*, Patton, ♀ ?; *Philanthus ventralis*, Fabr., ♀; *Euspongus bipunctatus*, Say, ♀; *Ceratina tejonensis*, Cress., ♂.

The last species is much like small specimens of *C. dupla*, Say, but seems to be distinct by the strongly angulated femora. It has been recorded by Provancher (*Faune Entomologique*, Vol. II., p. 812), who received two specimens from Mr. Brodie, of Toronto,

EUDRYAS STAË. JOHANNIS REDIVIVUS.

BY A. RADCLIFFE GROTE, A. M., HILDESHEIM, GERMANY.

Readers of the CANADIAN ENTOMOLOGIST will recall the controversy between Prof. Smith and myself as to the species described by Walker as *Eudryas Staë. Johannis*, the type of which was examined in 1867 by Grote & Robinson, and pronounced a distinct species allied to *grata*. I had supposed the insect owed its name to the St. John's River, Florida, but, according to Mr. Smith (C. E., XXIV., 133), the type bore a label that it was taken on a church door in England. Mr. Smith, relying on the label, invented the theory that: "in some way the pupa of the insect was transported to England, and through the vicissitudes encountered an aberration was produced." This writer has "no hesitation in referring the species as a suffused aberrant *grata*." There is no band on the hind wings, but, nevertheless, it is set down as a "suffused" specimen of *grata*, which always, so far as known, has a band! For my answer to this, see my paper, CAN. ENT., XXV., 320, where, aided by Mr. Tutt's memoranda as to the given English locality on the label, I discussed the *pro* and *con.* of the above theory. Now I am in receipt of a letter from Mr. Schaus, that *Eudryas Staë. Johannis* has been re-discovered in Mexico. My kind correspondent writes: "It will interest you to know that I have recently seen several specimens of *Eudryas Staë. Johannis*, Walk., from Mexico; they were sent to Mr. Druce by a native who is now collecting." Thus the theory of the "vicissitudes of the voyage" vanishes; the specific validity of *Staë. Johannis* asserted by us in 1868, before Mr. Smith was (entomologically speaking) born, is vindicated. But more than this: the sequel shows that, instead of adopting the more credible theory that Walker's "type" had in some way been provided with a label belonging to a different specimen, Mr. Smith thought it "probable that in some way the pupa of the insect was transported to England." Having pinned his faith to the label, Mr. Smith then constructed the theory of "suffusion" to account for the differences, and then invented the "vicissitudes of the voyage" to account for the "suffusion." I think it is now plain that sufficient proof is offered that Mr. Smith blindly accepts a label, and that this throws light upon his work in his recent Catalogue, where he has accepted whatever Mr. Butler showed him as being Walker's "types"; whereas the fact is, that Walker did not label his "types" as such, and the specimens now so designated have been shifted and sorted out by Mr. Butler. I have offered evidence that the specimens now shown as the

"types" of *Acronycta cristifera*, *Xylina signosa*, *Hormisa absorptalis*, are not the specimens seen in their original position by myself, Prof. Fernald, and Grote & Robinson. Probably other cases exist. The basis of a specific name is found in literature, not in a collection or a supposed "type." A label may be changed or lost, a specimen may be substituted; the description is clearly the only warrant for the name that cannot be altered. The manner in which Mr. Smith speaks of Walker's and Guenee's "types," as if he knew anything certain about the specimens shown him as such, his neglect in each and every case to compare the British Museum "type" with the Lists, stamps his method, pursued in the "Catalogue," as uncritical, if not "unscientific." Mr. Smith has made a number of remarks based on the fact that, in Mr. Neumoegen's collection, I am supposed to have labelled some specimens (from memory) of difficult Agrotids wrongly. If the fact is really so, these determinations were never intended to be published, but the magnitude of my fault, amplified by Mr. Smith, really pales before the fact that, in the "Revision," Mr. Smith unites my *cupidissima*, *orbis* and *laetula*, and invents another *Eudryas Stæ. Johannis* theory (p. 25), that I had "confounded two distinct species, one with open orbicula and one with closed"; while in the Catalogue, after seeing my types, he separates as distinct the three species (p. 56), and abandons the positively stated theory of the "Revision" without a word of apology.

But though the mystery of *Stæ. Johannis* is now cleared up, as to the home of the species, and its undoubted validity, the "type" in the British Museum is still without a certain locality. If *Stæ. Johannis* is found in Mexico, may it not be found on the banks of the St. John's River, in Florida, also? Is it not now somewhat probable that the "type" was really collected there by Doubleday? At any rate, Florida collectors will do well to look for the species, which belongs apparently to the Tropical fauna of America north of the Equator. We have, then, three allied species of the genus forming a group by themselves: *grata*, Fab.; *Stæ. Johannis*, Walk., and *cypria*, Grt. As to the name for the genus, I have given the argument. No one living, probably, regrets more than I do that, in the strict letter of the law, we must abandon the beautiful Wood Nymph for *Euthisanotia*, and use for *timais*, according to Berg's restriction, the name *Xanthopastis*. Thus the type of *Euthisanotia* would be *unio*, and with this, *brevipennis*, Stretch, from California, seems strictly congeneric. I wish Mr. Dyar would examine *Stæ. Johannis* and *grata*, to see if this group offers any structural distinctive characters.

REMARKS ON APATELODES SUGGESTED BY AN ARTICLE
BY MR. SCHAUS.

BY HARRISON G. DYAR, A. M., NEW YORK.

Mr. Schaus, in describing some new species of South American moths (*Proc. Zool. Soc., Lond.*, 1894, p. 233), casually refers the genus *Apateodes* to the Eupterotidae. As this genus has been placed among the Notodontidae by American authors, it may be worth while to examine the arguments for this position.

The Eupterotidae of Hampson are a series of mostly large moths from India, with geometriform markings, of a peculiar and rather characteristic appearance. The body is proportionately rather small and slender, and the fringes of the wings are long. Their hairy vestiture, broad wings and short cell suggest the Lasiocampidae, where they are placed by Kirby. They are, however, frenate, and with the venation essentially of Notodontidae, but without the accessory cell. Two genera, at least, are included (*Gangarides* and *Cnethocampa*), which differ considerably in habitus. In these, the body is stouter proportionately, the wings are narrower and the cell longer, while the general appearance suggests the Notodontidae rather than the other Eupterotidae. Mr. Hampson separates these families by the absence of the tongue in the Eupterotidae; but, as this member seems to be equally lacking in the notodontian *Melelopha* (*Ichthyura*), the separation seems hardly very sharp.

Of the larvae, I only know those of *Cnethocampa* (*Thaumetopaea*, Hubn.). Unfortunately, these belong to the atypical section just referred to, and it is hardly fair to judge the Eupterotidae by these. Very little can be positively made out from figures, usually; though that of the larva of *Eupterota fabia* seems to exhibit the same type of structure as *Cnethocampa*. Judged on these data, the larval Eupterotidae belong to the Lymantriid section of the Noctuina, characterized by the presence of warts, three warts above stigmatal wart on the last two thoracic segments. They differ from the Lymantriidae by the reduction of wart v. instead of iv. and the presence of secondary hairs.

To turn now to *Apateodes*. In *angelica* there is a little accessory cell on a long stalk; but in *torrefacta* there is none, and veins 7-8 and 9-10 arise as two pairs from a short furcation of the long stalk from apex of cell. The hind wings are frenate and the tongue is wanting. The habitus is not that of the typical section of the Eupterotidae, but there is

nothing positive to distinguish it from the other group represented by *Gangarides* and *Cnethocampa*.

The larva of *torrefacta* certainly possesses a fine development of secondary hairs; but so does *Datana* and, to a less degree, *Malalopha*. Unfortunately, the secondary coating is so well developed that the warts, even if present, are obscured, and I cannot make out their arrangement on the thorax. On the abdomen, the pale spots representing the wart areas rather suggest the retaining of wart iv. at the expense of v.; but the character is so faint that nothing definite can be argued from it.

Thus we see that nothing at present contradicts the position assigned to *Apatelodes* by Mr. Schaus; though, on the other hand, nothing positive confirms it. Shall we add the family *Eupterotidae* to our lists on this evidence?

I would like to remark that if it should turn out, as I now suspect, that the *Lasiocampidae* belong to the *Lymantriid* section of the *Noctuina*, and that Mr. Schaus is right in assigning *Apatelodes* to the *Eupterotidae*, then the close resemblance of *A. angelica* larva to a *lasiocampid*, to which I have referred [See Ann. N. Y. Acad. Sci., Vol. VIII, p. 229], may be better understood.

A FEW POINTS IN COLLECTING ICHNEUMONIDÆ.

BY G. C. DAVIS, AGRICULTURAL COLLEGE, MICH.

The Ichneumonidæ have habits and peculiarities as distinctly their own as other families and orders of insects. In collecting them one will find, after a little experience, that certain species or even groups will frequent certain places where conditions are favourable and their host is likely to be found.

The *Pimplinæ*, with long ovipositors, should be sought for in a wooded region around dead or diseased wood, where their hosts, the borers, are at work. One of the best places I have found for collecting them is around piles of dead block-wood cut the preceding winter. They are most common in Michigan in June and early July. *Xylonomus* and *Grotia* may often be found as pupæ in the hollow stems of shrubs in the spring, where they have already destroyed their host and are securely wrapped in a papery case of their own. The portion of the subfamily with shorter ovipositors, such as *Pimpla* and *Glypta*, apparently work on caterpillars, and are quite as common during the fall as in the summer. The *Ophioninæ* are much the most common in the fall. The

Ichneumoninae and *Cryptinae* are the earliest to appear; in fact, I have taken many hibernating specimens of *Ichneumon* and *Amblyteles* safely stored away amid the frost, in some old rotten log or under loose bark.

In collecting species of *Ichneumon*, *Cryptus* and *Ophioninae*, I have had my best success by collecting along a dense, moderately high hedge-fence, and amongst bushes and low trees bordering a forest or a swamp. A person will succeed much better if he will select one spot and watch the specimens as they pass him, rather than to keep constantly on the move. Sometimes better success will come from selecting several spots not far from each other, and collecting alternately from each one.

Three years ago this season I accidentally happened on a little ruse that has since yielded me many rare specimens that otherwise I am sure I should never have obtained. It is merely trampling down a few of the bushes in some spot on the edge of the thicket where one wishes to collect. As an Ichneumonid comes along, it will almost invariably make a slight halt over or near the trampled vegetation. The halt, though hardly noticeable, is sufficient for one to scoop the specimen with the net. The rare *Ichneumon albomarginatus*, Cr., is such a shy and rapid flyer that I was never able to capture one until this method was used. The why of this method is probably explained by the fact that the bruised plants give off a similar odour to what they would were they eaten by some caterpillar, and the parasite halts to look for the cause of the odour.

Late in the autumn, after frosts have killed the flowers, and larvæ have mostly pupated, I have been very successful in collecting *Tryphoninae* and other *Ichneumonidae* on a little isolated group of larches, located on our college grounds. The parasites and wasps found something to feed upon that attracted them for at least two weeks. There were no plant-lice to be found, and apparently it was the pitch or resin.

The wingless *Pezomachus* I have most commonly found on herbaceous plants in waste places. The best method of securing them is by sweeping. A collector may have fair success in sweeping for other parasites, especially the smaller species, but generally his catch will consist mostly of the commoner species. With a little practice, a collector will accustom his eye so that he will readily spy even the minute Ichneumonids as they approach him on the wing. Of course, rearing parasites is a very desirable way of obtaining them, but we must both rear and collect if the greatest progress is to be made.

PRELIMINARY STUDIES IN SIPHONAPTERA.—V.

BY CARL F. BAKER, FORT COLLINS, COLO.

Genus Pulex (Division III.)

TABLE OF SPECIES.

A. Head gently and evenly rounded from occiput to mouth; eyes in anterior half of head, about equally distant from upper and lower edges; antennal groove in middle of head; mandibles reaching two-thirds of anterior coxae.....*B.*

AA. Head more or less distinctly angled in front above, not evenly rounded from occiput to mouth; head combs of 5 to 6 spines; in anterior tarsi joint 1 equals 3; in middle tarsi joint 2 a little shorter than 5; in posterior tarsi joint 2 equals 5 and as long as 3 and 4 together, while 1 is one-half longer than 2; abdominal segments with one row of bristles above and below; posterior femora with a row of bristles on the side.....*D.*

B. Abdominal segments above each with three rows of bristles, each row with 8 to 12 bristles on either side, below two rows, the first with 4 to 7, the second with 6 to 7 bristles on either side; eye small; bristles on joint 2 of antennæ as long as joint 3; maxillary palpi in female with joint 2 two-thirds of 4, and 3 about one-half of 4; labial palpi 5-jointed; head combs with 1 or 2 spines on either side; pronotal comb of 20 spines; in middle tarsi joint 2 three-fifths of 1, 2 one-fourth longer than 5, 5 more than twice 4, and 1 as long as 3, 4 and 5 together; in posterior tarsi joint 1 as long as 2 and 3 together; 5 a little more than one-third of 1, while 2 is more than 3 and 4 together, and more than 4 and 5 together; apical spine on joint 2 of hind tarsi shorter than joint 3; posterior femora without a row of bristles on the side; colour, light reddish-brown; length: female, 4 mm.....*gigas.*

BB. Abdominal segments above each with one row of bristles, 5 to 8 on either side; below one row of 2 to 4 bristles on either side; eye very large; bristles on joint 2 of antennæ shorter than joint 3; maxillary palpi with joint 2 about equalling 4, and 3 two-thirds of 4; labial palpi 4-jointed; in anterior tarsi joint 3 three-fourths of 2, 5 about two and one-half times 4, and less than 1 and 2 together; in middle tarsi 2 one-half longer than 1, 5 two and one-half or three times 4, 1 about equalling 3; in posterior tarsi joint 5 more

than one-half of 1, 2 as long as 3 and 4 together; posterior femora with a row of bristles on the side..... C.

C. Head combs of 6 to 9 spines, pronotal comb of 14 to 18 spines; in anterior tarsi joint 3 about equals 1; in middle tarsi 2 equals 5 or less; in posterior tarsi 1 as long as 2 and 3 together, and 2 less than 4 and 5 together; apical spines on joint 2 of hind tarsi as long or longer than joint 3; male claspers oval, the broad portion pointing up and back, thickly finely haired around the upper end; colour, dark brown above, lighter below; length: female, 2.5-3 mm.; male, 1.5-2 mm..... *serraticeps*.

CC. Head combs of 2 to 3 spines, pronotal comb of 6 spines; in anterior tarsi joint 3 longer than 1; in middle tarsi joint 2 one-fifth longer than 5; in posterior tarsi 1 about one-third longer than 2, 2 one-fourth longer than 5; apical spine on joint 2 of hind tarsi longer than joints 3 and 4 together; male claspers inverted shoe-shaped, the toe pointing backward, moderately hairy above; colour, dark brown; length: female, 3 mm.; male, 2.5 mm..... *erinacei*.

D. Maxillary palpi with joint 2 as long as 3 and 4 together, and 3 three-fourths of 4; head obtusely angled in front above; eye large, at the middle, and nearer the upper than the lower edge; antennæ in posterior half of head; bristles on joint 2 as long as joint 3; labial palpi 4-jointed; mandibles reaching to end of anterior trochanters; pronotal comb of 16 spines; in anterior tarsi joint 3 three-fourths of 2, 4 shorter than 3, 5 as long as 2, 3 and 4 together; in middle tarsi 3 slightly longer than 4, 1 much longer; apical spine on second joint of posterior tarsi longer than joints 3 and 4 together; dorsal rows of bristles on abdominal segments with 5 to 8 bristles on either side, ventral with 2 to 4 on either side; male claspers as in *erinacei*, except not so rounded, and very thickly hairy above; colour, dark brown; length: female, 1.75-2.25 mm.; male, 1.5 mm..... *inaequalis*, n. sp.

DD. Maxillary palpi with joints of equal length; head sharply angled in front above; eye moderate, in anterior half of head, and about equally distant from upper and lower edges; mandibles reaching to two-thirds of anterior coxae; pronotal comb of 12 spines; in anterior tarsi joint 5 nearly as long as 2, 3 and 4 together; in middle tarsi 3 as long as 4, 1 a little longer; male claspers narrow, curved backward, thickly hairy above; colour, yellowish-brown; length, 2 mm..... *gonocephalus*.

Pulex gigas, Kirby.

1837. Kirby, Faun. Boreali-Amer. IV., p. 318, pl. 6, fig. 9 (P. gigas).

I have referred to this species, specimens taken on cotton-tail rabbit at Lansing, Michigan. The spines on the cheeks are easily overlooked,

and often broken entirely off. It is one of the largest and most well-marked of the known North American fleas. Ritsema, to whom the species was unknown, suggested that it might possibly be identical with *Hystrichopsylla obtusiceps*. This was, however, merely a guess, as it does not bear the slightest resemblance to that species. It was originally described from specimens taken in Canada.

Pulex serraticeps, Gervais.

1832. Duges, Ann. d. Sci. Nat. XXVII., p. 157, pl. 4, fig. 2, 5-9 (P. canis).
 1835. Bouche, Nov. Act. Acad. Leop. Carol. XVII., 1, p. 595 (P. felis).
 1844. Gervais, Hist. Nat. des Insectes. Apterous. III., p. 371, pl. 48, fig. 8 (P. serraticeps).

This is the common cat and dog flea, well-known from all parts of the world. Besides various wild cats and dogs, it has been reported from *Herpestes ichneumon*, *Foetorius putorius*, *Hyaena striata*, *Lepus timidus*, and *Procyon lotor*. It is also stated to occasionally sip human blood. I have specimens from various parts of North America, and also from Europe.

Pulex erinacei, Bouche.

1835. Bouche, Nov. Act. Acad. Leop. Carol. XVII., 1, p. 597 (P. erinacei).

I have received a series of specimens of this species from Dr. Taschenberg, taken in Germany on *Erinaceus europeus*, which is the only known host.

Pulex inaequalis, n. sp.

Mr. A. B. Cordley sent me a series of specimens of this species taken on cotton-tail and jack rabbits, near the Grand Canon in Arizona. It seems to be the North American representative of *gonocephalus*, but differs very widely from that species as described and figured by Dr. Taschenberg. A variety of this species, which I will call var. *simplex*, occurs on a species of *Lepus* in Michigan. It may eventually prove to be a good species, but it bears such a close resemblance to *inaequalis* that I cannot at this time recognize it as more than a variety of that species. The slightly larger size, 2.5 mm., the head combs of 8 spines, and the pronotal comb of 14 spines, will separate it from the typical form, while the proportions of the tarsal joints and other details are nearly identical.

Pulex gonocephalus, Taschenberg.

1880. Taschenberg, Die Flohe, p. 82, pl. III., fig. 20 (P. gonocephalus).

Recorded from Europe as occurring on hares and rabbits, *Capra ibex*, and *Canis vulpes*.

[TO BE CONTINUED.]

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